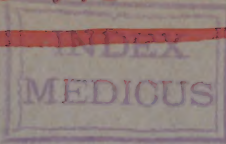


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DIRECT TRITURATION.

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RIPENING OF IMMATURE CATARACT BY DIRECT TRITURATION.

BY BOERNE BETTMAN, M. D.,
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BY way of introduction of my report of a successful case of ripening an unripe cataract by direct trituration, permit me to review in a concise manner the history of this innovation and the reasons which led to its adoption.

Up to ten years ago oculists regarded the complete maturity of a cataract as a *sine qua non* prior to the undertaking of an operation. Old men and women were forced to wait tedious months and years for the fruition of their hopes, and only then when qualitative vision was entirely abolished, when sight was reduced to mere perception of light would the operator venture to extract the lens. The pleadings of patients for more rapid relief, and the inherent instinct of progressive men for medical advancement prompted many oculists to devise methods by which maturity of the cataract could be hastened. The one most frequently employed is that of Förster, of Breslau. The principle involved is to break down the lens fibers and thus induce their rapid degeneration and opacity. This is accomplished by pressing on the cornea, after doing an iridectomy, with a spoon or strabismus hook. The force is transmitted indirectly to the unripe cataract, and through this massage it is rendered entirely opaque in a varying period of time.

Many observers complained of the iritis set up by the mechanical irritation to which the rainbow membrane is subjected by this procedure. Mr. McHardy in a paper read at the Eighth International Congress of Ophthalmologists, held at Edinburgh, in August, 1894, mentions its occurrence in this connection in from 2 to 17 per cent of all his cases. Another objection which held good in 1883 was the necessity of doing an iridectomy. This, however, has been obviated since White, some two or three years ago, introduced his modification of first making a paracentesis, and drawing off the aqueous humor, thereby permitting the lens to come in contact with the posterior surface of the cornea, and then making massage. To obviate these difficulties and to insure more rapid ripening, I in 1883, for the first time, essayed my method of direct trituration. The result obtained was so satisfactory that I



have depended upon it ever since. Up to the time of the introduction of the simple extraction, I combined the massage with an iridectomy. In the last few years, however, I have not excised a piece of the iris, but have practiced the simple direct massage only. After entering the anterior chamber with a small lance-shaped knife, as is done in a glaucoma operation, a trowel-shaped spatula is introduced, its flat surface placed against that of the lens, either in the pupillary area or when the iris is contracted underneath the iris and a half dozen to a dozen passes made over the cataractous lens. The pressure exerted is uniform and naturally not very severe. This done, the spatula is removed, the eye washed with an antiseptic solution and bandaged never longer than two days. Ordinarily one day will suffice.

In 1887 I first made known my operation in a paper read before the Chicago Medical Society, and later published in the first December number of that year of the *Journal of the American Medical Association*. In the discussion which followed fear was expressed that direct massage might cause dislocation of the lens and subsequent complications, as cyclitis and destruction of the eye. These *a priori* objections were replied to and satisfactorily explained. In a subsequent article published in 1892 in the *Chicago Medical Recorder* of April, a report of seventeen successful consecutive cases, with excellent results in each, must be regarded as conclusive evidence of the innocuousness of direct trituration. In only two of the cases reported was there a slight escape of vitreous during the extraction of the cataract due to accidents at the time of the operation. This slight mishap, however, did not affect in the slightest degree the final results.

During the last few years authorities like Knapp and Hirschberg have decried all methods of artificial ripening. They claim they are unnecessary, since cataracts can be successfully extracted even if not perfectly mature. The danger of transparent lens substance which may adhere to the posterior surface of the anterior capsule or in the bag proper, is not feared by Knapp, owing to its imprisoned condition in the capsular sac which follows a peripheric capsulotomy. Others again, especially Wickeriawicz, thought the transparent lens substance which did not escape with the main body of the cataract could be flushed out of the anterior chamber with an antiseptic solution. At the Milwaukee meeting of the American Medical Association in 1893, I devoted special attention to these points in a third paper on the subject of "direct trituration." I again advocated the harmlessness of my method by

describing experiments made on rabbits for the express purpose of determining the amount of pressure which could be exerted upon the lens without disturbing its anatomical relationship; in other words, to ascertain how forcibly the lens could be triturated without rupturing capsule and suspensory ligament. In every case I succeeded in producing more or less opacity of the lens; in none was injury done to the capsule or zonula zinn, although the trituration was far more severe than I would dare to attempt in a human eye. I also reported two cases in which the cataract was so slightly advanced that a dim view of the fundus was discernible. I wish to re-emphasize in this paper, as I have done in the others, that I exclude from these remarks sclerosed amber-colored cataracts such as never become altogether opaque. These two cases which were successfully ripened, and extracted within three weeks were intended to refute the claims made by the adherents of extraction of not fully mature cataracts, for I doubt whether any conscientious oculist would have ventured to operate on the cases to which I have just referred, in the slightly advanced condition or stage of opacity of the lens in which I found them. To the query, at what stage of immaturity of the cataract the advocates of extraction of unripe lenses operate? How slightly advanced may the cataract be when these gentlemen will attempt its removal?

No answer was given in the discussion which followed the reading of my paper. The time is long since past when complete maturity of a cataract is deemed essential before an operation is considered justifiable. Very few men will hesitate to remove an opaque lens with the superficial part of the anterior cortex still transparent. Extraction of cataracts (softer variety) from eyes having $2\frac{3}{20}$ vision is now practiced daily. But do the defenders of early extraction operate where fingers can be counted at a distance of from 8 to 10 feet? Do they attempt to remove cataracts (softer variety) through which parts of the fundus can still be seen? Until I am answered in the affirmative, I shall continue to doubt the advisability of extracting such, relatively speaking, highly immature cataracts.

The statements made with regard to the removal of unripe cataracts must be accepted with limitations which have not as yet been accurately defined. As an illustration of the above, I will detail the clinical history of Mr. H. C., who was operated on a few months ago. He was admitted into the Illinois Charitable Eye and Ear Infirmary June 26, 1894, with the following diagnosis: R. E. immature senile cataract. Anterior cortex, with the excep-

tion of a few broad striæ at the outer edge, perfectly transparent. Body of lens showed broad satiny opaque bands. A dim red reflex obtained on ophthalmoscopic examination through parts of the lens. When patient is placed with back at the intersection of two windows at one end of a room, fingers are readily counted at a distance of 8 feet near the other end of a dimly lighted chamber. Obscuration of sight was noticed about three years ago. Left eye incipient cataract. On July 5, after having thoroughly cleansed the face, eyebrows, with soap, and, later on, the lids and conjunctival sac with a 1:5000 solution of bichlorid of mercury. I passed a small lance-shaped knife into the anterior chamber, entering about 1 mm. behind the upper corneo-scleral margin. The incision was made large enough not to interfere with the lateral movements of the trowel-shaped spatula. The latter instrument was quickly passed through the opening to prevent the escape of aqueous humor. The depressed flat end was slid over the lens in the large pupillary area. Firm but even to and fro passes were made, care being taken not to rub the iris with the shank of the instrument. After its careful and rapid removal, the eye was again flushed with the bichlorid solution, a drop of atropin was instilled and both eyes bandaged. The next day the eye appeared absolutely normal excepting a slight rosiness in the region of the incision. On the second day the bandage was entirely removed and the patient given the liberty of the institution. Two weeks later vision had decreased to perception of light only. On July 26 I prepared the patient for the subsequent extraction of the now fully ripe cataract by again subjecting him to the antiseptic rigor carried out in all operative patients. With a Graefe's knife I made a corneal flap upward through two-fifths of the corneal area. The rapid escape of the aqueous humor floated the iris upon my knife, necessitating an iridectomy which was followed by a T-shaped capsulotomy. The body of the lens was easily delivered. The sticky adhesive opaque cortex was readily forced out in bulk by pressure on the cornea by a spoon. Instillation of an antiseptic wash and atropin was followed by bandaging of both eyes.

July 29, bandage removed and eye found in a passive condition. From this time on the patient made an uneventful recovery. During the entire period no injection of the eye was present and patient did not complain of any discomfort. On August 16 he was discharged, 12 D. glass giving him $V. = \frac{2}{40}$. He is expected to return for a change of glasses; the addition of a cylinder will

no doubt increase his visual power. Knowing that the cortex was opaque throughout and feeling certain that it could readily be removed, and thus avoid secondary iritis and cyclitis, I made a T-shaped opening in the capsule and have saved the patient the annoyance of a secondary operation. It may be argued that the discomfiture to the patient, arising from a secondary capsulotomy, is no greater than that due to trituration of the lens. This I readily admit. In both cases he is subjected to two operations. But other things being equal, by direct trituration he derives the greater advantage of having his cataract fully ripened and escaping the dangers due to floating pieces of transparent cortex in the anterior chamber. This danger is lessened by doing Knapp's peripheric capsulotomy. Furthermore, of more importance is the fact that direct trituration hastens the ripening of a cataract. It is applicable to such cases where an early extraction would probably not be undertaken. It saves the patient valuable time and relieves him much sooner of the miseries his complaint subjects him to. In conclusion, I will again repeat the conclusions deduced from my years of experience and the twenty-four consecutive reported cases.

(1) Artificial ripening of cataracts is in properly selected cases demanded; (2) direct trituration is preferable to other methods; it is easily performed by one possessing ordinary skill; (3) it is not followed by any untoward symptoms, consequently it is a safe and reliable procedure; (4) it is not indicated where sclerosis involves the bulk of the lens; (5) it is especially useful in senile cataracts with soft cortex; (6) the results of the massage are marked and rapid; (7) maturity of the cataract is usually induced in three weeks, often sooner; (8) very little discomfort is caused the patient aside from bandaging the eye two days; (9) at the subsequent extraction of the lens, the cortical substance is readily removed and dangers of iritis and suppuration of the corneal wounds are lessened.

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